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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/726,533	12/01/2000	Mari Matsunaga	200309US2	1126

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1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

DEPPE, BETSY LEE

ART UNIT	PAPER NUMBER
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2637

DATE MAILED: 08/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/726,533

Applicant(s)

MATSUNAGA ET AL.

Examiner

Betsy L. Deppe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings were received on June 2, 2004. These drawings are approved.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2, 4 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation recited in claim 2, lines 6-11, claim 4, lines 6-12 and claim 6, lines 6-12, respectively, is difficult to understand because it is grammatically awkward. It is unclear what is meant by "... in the states of differential phase corresponding to bits obtained by inverting the hard decision data are used as components, is defined as reliability information of the hard decision data." Is the "reliability information" in the respective dependent claims the same as that in the respective dependent claims? It is unclear how "inverting the hard decision data" relates to the difference.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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5. Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in Figure 10 of the present application in view of Blasiak et al. (US Patent No. 5,706,313 cited in the Office Action mailed March 3, 2004, Paper No. 3) and Chouly (US Patent No. 6,574,775). Figure 10 in the present application discloses the claimed invention except for decoding based on the soft decision demodulated data. (See page 3, line 11 – page 7, line 22)

Figure 2 of Blasiak et al. discloses using a soft decision demodulated data estimating unit (201) and a decoding unit for decoding based on the soft decision demodulated data in a differential phase shift keying demodulator. (See column 3, line 18 - column 5, line 55) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a soft decision demodulated data estimating unit (as disclosed by Blasiak et al.) instead of the hard decision estimating unit in the admitted prior art of Figure 10 in order to improve the bit error rate performance of the demodulator. (See Blasiak et al. column 2, lines 52-58)

Chouly discloses generating a soft decision equal to the product of a reliability data and hard decision data. (See column 3, lines 49-52) It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the soft decision demodulated data estimating unit by multiplying the hard decision provided by the Viterbi Sequence Estimation Unit (530) in Figure 10 with reliability information in order to have a simple soft decision demodulated data estimating unit that requires minimal calculations. Using minimal calculations for generating soft decision data minimizes the overall circuit size and power requirements.

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Since the circuit disclosed by the admitted prior art in Figure 10 in view of Blasiak et al. and Chouly includes using the Viterbi sequence estimation unit (530), the admitted prior art in Figure 10 in view of Blasiak et al. and Chouly teaches using a trellis diagram and survival path metric as recited in claim 1, lines 6-12. (See page 3, line 11 - page 8, line 6)

6. Claims 3, 5, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in Figure 10 of the present application in view of Blasiak et al., Chouly, and Nagayasu et al. (US Patent No. 6,269,124 B1 cited in the Office Action mailed March 3, 2004, Paper No. 3). Figure 10 in the present application discloses the claimed invention except for a soft decision demodulated data estimating unit that estimates soft decision demodulated data based on a survival path metric, a power detection unit, a p-multiplying unit, and a decoding unit for decoding based on the soft decision demodulated data. (See page 3, line 11 – page 7, line 22)

Figure 2 of Blasiak et al. discloses using a soft decision demodulated data estimating unit (201) and a decoding unit for decoding based on the soft decision demodulated data in a differential phase shift keying demodulator. (See column 3, line 18 - column 5, line 55) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a soft decision demodulated data estimating unit (as disclosed by Blasiak et al.) instead of the hard decision estimating unit in the admitted prior art of Figure 10 in order to improve the bit error rate performance of the demodulator. (See Blasiak et al. column 2, lines 52-58)

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Chouly discloses generating a soft decision equal to the product of a reliability data and hard decision data. (See column 3, lines 49-52) It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the soft decision demodulated data estimating unit by multiplying the hard decision provided by the Viterbi Sequence Estimation Unit (530) in Figure 10 with reliability information in order to have a simple soft decision demodulated data estimating unit that requires minimal calculations. Using minimal calculations for generating soft decision data minimizes the overall circuit size and power requirements.

Since the circuit disclosed by the admitted prior art in Figure 10 in view of Blasiak et al. and Chouly includes using the Viterbi sequence estimation unit (530), the admitted prior art in Figure 10 in view of Blasiak et al. and Chouly teaches using a trellis diagram and survival path metric as recited in claim 1, lines 6-12. (See page 3, line 11 - page 8, line 6)

However, the admitted prior art in Figure 10 of the present invention in view of Blasiak et al. and Chouly does not disclose a power detection unit and a p-multiplying unit wherein the results of these units are used by the soft decision demodulated data estimating unit. Figures 4 and 7 of Nagayasu et al. teaches using a power detection unit and a p-multiplying unit wherein the results of these units are used by the soft decision demodulated data estimating unit. (See column 7, lines 10-24 and column 7, line 66 – column 8, line 4) It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the teaching of Nagayasu et al. into the circuit disclosed by the admitted prior art in Figure 10 of the present invention in

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view of Blasiak et al. and Nagayasu in order to further improve the bit error performance of the receiver.

7. Claims 8, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakoda et al. (US Patent No. 6,574,283 B1 cited in the Office Action mailed March 3, 2004, Paper No. 3) in view of the admitted prior art in Figure 10 in the present application, Blasiak et al. and Chouly. Figures 2a and 3a disclose the claimed invention except for a receiver having a multiple differential phase detected signal output unit and a soft decision demodulated data estimating unit. (See column 1, line 48 – column 3, line 30)

As explained in the rejection of claims 1 and 7 above, the combination of the admitted prior art in Figure 10 in the present application, Blasiak et al. and Chouly discloses the recited multiple differential phase detected signal output unit and the soft decision demodulated data estimating unit. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the circuit disclosed by the combination of the admitted art in Figure 10 in the present application, Blasiak et al. and Chouly in the DQPSK demodulation circuit (13) of Sakoda et al. in order to improve the bit error rate performance of the DQPSK system by using soft decision demodulation.

8. Claims 10, 12 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakoda et al. in view of the admitted prior art in Figure 10 in the

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present application, Blasiak et al., Chouly and Nagayasu et al. Figures 2a and 3a disclose the claimed invention except for a receiver having a multiple differential phase detected signal output unit and the soft decision demodulated data estimating unit wherein the soft decision demodulated data estimating unit that estimates soft decision demodulated data based on a survival path metric, a power detection unit, a p-multiplying unit, and a decoding unit for decoding based on the soft decision demodulated data. (See column 1, line 48 – column 3, line 30)

As explained in the rejection of claims 3 and 5 above, the combination of the admitted prior art in Figure 10 in the present application, Blasiak et al., Chouly and Nagayasu et al. discloses the recited multiple differential phase detected signal output unit and the soft decision demodulated data estimating unit wherein the soft decision demodulated data estimating unit that estimates soft decision demodulated data based on a survival path metric, a power detection unit, a p-multiplying unit, and a decoding unit for decoding based on the soft decision demodulated data. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the circuit disclosed by the combination of the admitted art in Figure 10 in the present application, Blasiak et al., Chouly and Nagayasu et al. in the DQPSK demodulation circuit (13) of Sakoda et al. in order to improve the bit error rate performance of the DQPSK system by using soft decision demodulation.

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Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Betsy L. Deppe whose telephone number is (703) 305-4960. The examiner can normally be reached on Monday, Wednesday and Thursday (8:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel, can be reached on (703) 308-7728.

Any response to this action should be mailed to:


Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Betsy L. Deppe
Primary Examiner
Art Unit 2637